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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,152	06/30/2003	Hakansson Bo	ANO 6444 US/1275	8148
27624	7590	01/24/2008		
AKZO NOBEL INC. INTELLECTUAL PROPERTY DEPARTMENT 120 WHITE PLAINS ROAD 3RD FLOOR TARRTOWN, NY 10591			EXAMINER WILKINS III, HARRY D	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 01/24/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/608,152

**Applicant(s)**

BO ET AL.

**Examiner**

Harry D. Wilkins, III

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/22/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Status*

1. The objections to claims 1 and 23 have been withdrawn in view of Applicant's amendments correcting the previously noted errors.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanngard (US 5,419,818) in view of Oda et al (US 4,299,682).

Wanngard teaches (see col. 1, lines 18-37, cols. 3-6) a process for producing alkali metal chlorate in a divided electrolytic cell (12) including electrolyzing the anolyte electrolyte solution and transferring the electrolyzed solution to a chlorate reactor (5). The cell (12) of Wanngard was preferably divided by a cationic selective membrane.

Wanngard teach that the electrolytic cell (12) is a divided electrolytic cell. In this process, the anolyte fed to the cell included NaCl and the catholyte included NaOH. The anolyte was electrolyzed to generate Cl<sub>2</sub> gas at the anode and the catholyte was electrolyzed to generate NaOH at the cathode. The Cl<sub>2</sub> was immediately hydrolyzed into HClO and HCl (Wanngard at col. 3, lines 59-68). The HClO is then reacted in the chlorate reactor to form sodium chlorate (NaClO<sub>3</sub>).

Thus, Wanngard fails to teach the claimed cell which had a gas diffusion cathode.

Oda et al teach (see abstract, figure 2, col. 1 and col. 4, line 30-col. 6, line 5) that in divided electrolytic cells for the electrolytic production of  $\text{Cl}_2$  and  $\text{NaOH}$ , the operating voltage of the cell can be reduced by using a gas diffusion cathode, and feeding oxygen to the cathode through a gas chamber 9.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the gas diffusion cathode as taught by Oda et al in the divided electrolysis cell taught by Wanngard because of decreased operating voltage which lead to an increased current efficiency.

It is noted that the overall reaction provided by the process cell of Oda et al is identical to the reaction provided by the process of Wanngard. Both cells react an incoming  $\text{NaCl}$  anolyte and  $\text{NaOH}$  catholyte to produce  $\text{Cl}_2$  gas at the anode and additional  $\text{NaOH}$  at the cathode. The  $\text{Cl}_2$  of Wanngard immediately dissolves into the solvent (water) to form  $\text{HClO}$  and  $\text{HCl}$ . Therefore, one of ordinary skill in the art would have had a reasonable expectation of successfully substituting the gas diffusion electrode of Oda et al into the cell of Wanngard.

Regarding claim 2, Oda et al teach (as above, figure 2) that the gas diffusion electrode divided the cathode compartment into a gas chamber (9) on one side of the gas diffusion electrode and an alkali metal hydroxide chamber (7) on the other side thereof. An alkali metal solution was introduced to the alkali metal hydroxide chamber at 12 and an oxygen containing gas was introduced to the gas chamber at 14.

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Regarding claim 3, Oda et al teach (as above) using a cation selective membrane.

Regarding claims 4-6 and 11, Wanngard teaches (see col. 6) using a pH of the solution of 5.5-6.5, a chloride concentration of 100-140 g/l, a chlorate concentration of 500-650 g/l and a temperature of 50-100°C.

Regarding claim 7, Wanngard does not teach the claimed concentration of chlorate. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the chlorate being fed to the electrolyzer in order to maximize current efficiency and achieve optimum production rate for chlorate.

Regarding claim 8, Wanngard teaches (see col. 7, lines 5-8) using a minor addition of sodium chromate. It would have been obvious to one of ordinary skill in the art to have optimized the amount of chromate used.

Regarding claim 9, Oda et al teach performing the electrolysis reaction without the addition of any chromate.

Regarding claim 10, Wanngard does not disclose a concentration of sodium hydroxide in the catholyte. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the hydroxide being produced in the electrolyzer in order to achieve proper reaction rate.

Regarding claim 12, Wanngard teaches feeding both the electrolyzed anolyte and the electrolyzed catholyte to the chlorate reactor (4).

Regarding claim 23, the cell of Oda et al included (see figure 2) a gas diffusion electrode (8) which divided the cathode compartment into a gas chamber (9) on one

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side of the gas diffusion electrode and an alkali metal hydroxide chamber (7) on the other side between the gas diffusion electrode and the cation selective separator. The process of Oda et al included (see Example 1) introducing a weak alkali metal hydroxide solution into the alkali metal hydroxide chamber and oxygen containing gas into the gas chamber. The cation selective separator was a membrane. Wanngard teaches (see cols. 3-4) using a pH of the solution of 5.0-7.5.

### ***Response to Arguments***

4. Applicant's arguments filed 6 December 2007 have been fully considered but they are not persuasive. Applicant argued that:

- a. Wanngard does not teach a cell equipped with a separator that is used to produce chlorate.

In response, it is noted that Wanngard in view of Oda et al teach the steps of introducing, electrolyzing and transferring as claimed. Of particular note is that Applicant's claim does not exclude the transferring step occurring without sending the solution to an intermediate reactor. Thus, Wanngard teaches electrolyzing the anolyte, transferring it to a second electrolyzer, and then transferring it to the chlorate reactor.

- b. The divided electrolytic cell of Wanngard does not produce alkali metal chlorate.

In response, it is noted that Applicant's claim does not require production of the alkali metal chlorate by the divided electrolytic cell. Further, Applicant's specification shows that chlorate is not produced by the divided electrolytic cell. It produces chlorine

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gas, which becomes hydrolyzed to hypochlorous acid (i.e.-not chlorate) which is reacted in the chlorate reactor to form chlorate.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ezzell et al (US 4,269,675) cited by the Russian Patent Office is noted. However, it appears to be substantially cumulative to the teachings of Oda et al as applied above.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

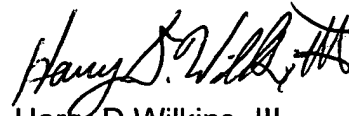
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Harry D Wilkins, III  
Primary Examiner  
Art Unit 1795

hdw